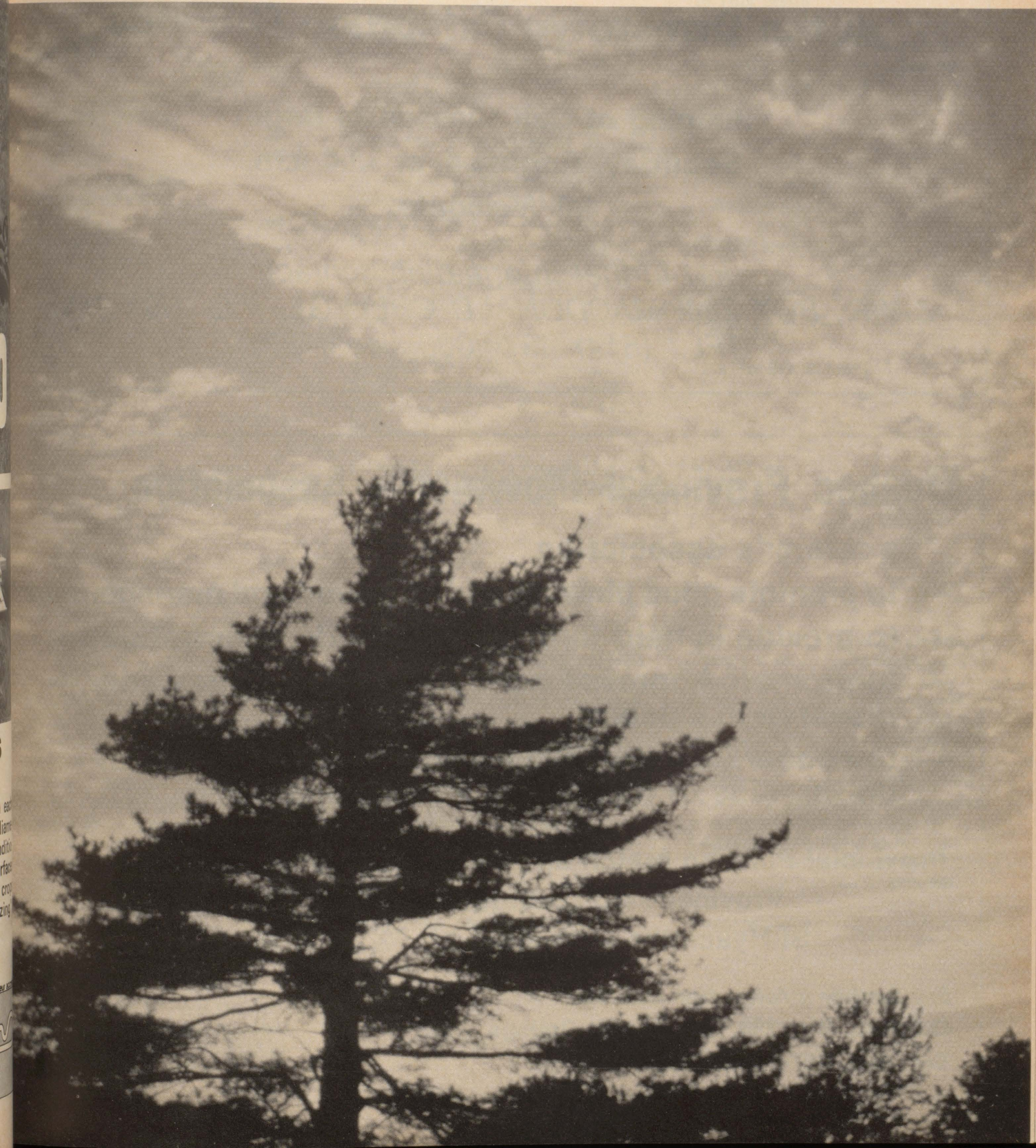


The Macdonald Journal

MAY 1979



QUEBEC YOUNG FARMERS' ASSOCIATION

4th ANNUAL PROVINCIAL CALF RALLY

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at the Ormstown Exhibition Grounds

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a farmer's association

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The Macdonald Journal

MAY 1979

Volume 40, No. 5
May, 1979

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The Macdonald Journal
is published every month
by Macdonald College.

Material in this issue may be
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all inquiries re editorial matter,
advertising, and subscriptions to:
The Editor, Box 284, Extension
Department, Macdonald College,
Quebec, H9X 1C0.
Second class mail registration
number 0463.

Subscription rates are \$3.00 for
one year, \$5.00 for two years, and
\$7.00 for three years in Canada.
Outside Canada — \$7.00 for two
years.

Printed by Harpell's Press Co-
operative, Gardenvale, Quebec.

In This Issue

Cover: A dappling of altocumulus
and cirrocumulus graces an evening
skyscape. See article on page 11.

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Journal Jottings

Members of the Faculty of
Agriculture and the School of Food
Science do a fair amount of required
travelling: to present papers, to at-
tend various committee meetings,
and so on. To use a colloquial ex-
pression "they're going places" and
so too, it seems, are some of our
former staff members. Professor
Helen Neilson of the School of Food
Science recently sent me the follow-
ing memo which she felt would be
of particular interest to Journal
readers.

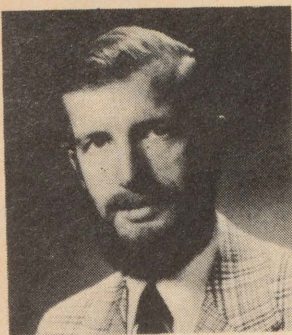
Association representative and was,
for a time, Editor of the Macdonald
Journal. Some of the readers who
remember Les would be interested
to know that he is now the Minister
of Labour in Premier Lougheed's
new cabinet in Alberta. He married
Helen McKirdy while they were both
at Macdonald. Helen is a graduate
in Food Science and was a lecturer
on the staff at that time."

I hope some of you will be going
places this summer, but for those of
us who may only be travelling as far
as the back yard, the barn, or the

fields, swatting at the air as we go,
there's a very appropriate article in
this issue — "It's the Biting Fly
Season Again!" Professor David
Lewis of the Department of Ento-
mology offers some good advice of
benefit to both humans and
livestock. I'm afraid that he cannot
guarantee that you'll stop swatting
nor the livestock switching, but it
certainly is gratifying to read that at-
tempts are being made to take the
bite and the itch out of summer.

Hazel M. Clarke

"On a recent trip to Edmonton,
Alberta, I visited Mr. and Mrs. Leslie
Young. Les was formerly located in
the Extension Department of Mac-
donald College as: Farm Forum
representative, Quebec Farmers'



Editorial

If you are not a part of 4-H, then what exactly is the Quebec Young Farmers' Association. We have been asked this question during the past years, and it is certainly not an easy one to answer. How does one explain the complete lack of interest of the provincial department of agriculture in the future farmers of this province?

The more than 70,000 4-H members from coast to coast are living proof of the enthusiasm, cooperation, and willingness to learn that is evident among today's youth.

There are many volunteer 4-H leaders across the country, including parents, senior members or interested community members. However, in most provinces it is the provincial department of agriculture that provides the financial resources needed to coordinate the many and varied programs.

The provincial departments of agriculture have been supporting the 4-H movement for years. They do not begrudge the monetary expenses needed to develop the potential of today's youth. It is interesting to note that the province of Prince Edward Island has more 4-H employees or persons employed to work with the rural youth sector than does the province of Quebec.

We were recently looking through some past issues of the Quebec Young Farmers (QYF) "News Spreader" and we came across a report on the 1975 Annual Meeting describing the policies of the MAQ (Ministère de l'Agriculture du Québec) regarding rural youth and young farmers clubs. In 1975, the MAQ initiated a program called "La Relève Agricole". Under this program, the department decided to concentrate most of the resources

and efforts upon future and established young farmers — those people who were either just starting or actually farming. Delegates to the 1975 QYF Annual Meeting disagreed with the policies of the MAQ. They felt that more effort should be concentrated on the members of the local young farmers clubs, i.e., the 10- to 20-age group.

Today, four years later, not much has changed. There are a number of rural youth clubs scattered throughout the province. Whether they call themselves Young Farmers, Jeunes Ruraux, or Jeunes Eleveurs makes no difference as they are involved in the same activities and all have the same goals.

It is certainly not the manpower or resources that are lacking here in Quebec, at the local level. There are thousands of youngsters willing to participate and parents and agronomes ready to give of their time. The Quebec Young Farmers' Provincial Federation feels that what is sadly lacking in this province is closer cooperation and the decisive support of the MAQ. At this point, one thing should be clarified: there are a number of agronomes in various regions who spend a lot of time working with young farmers. It is for the most part volunteer work for which they receive little or no recognition. These individuals truly have the interests of the rural youth and community at heart and should be congratulated for their efforts.

The MAQ, for reasons we do not comprehend, is unwilling to put any substantial effort and resources into the rural youth sector of Quebec. Over the past few years, many have tried to make the MAQ aware of the needs and its responsibilities towards this sector of society. QYF presented a brief to the MAQ in

1976 outlining its position. The association was willing to cooperate with the MAQ in setting up a provincial structure and at no time did it try to polarize itself based on its anglophone membership.

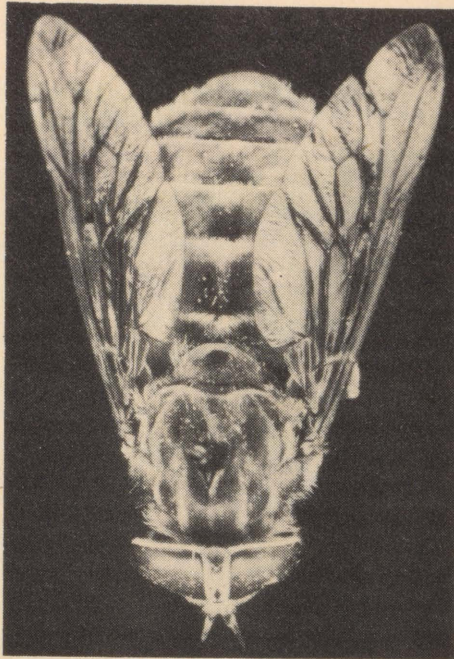
One group who is trying to organize a provincial structure for the rural youth sector in Quebec has been forced to approach another ministry in the provincial government for financial help. We feel, as do a number of other individuals and organizations in Quebec, that it is the responsibility of the Ministry of Agriculture to invest in the young farmers and future agriculture of this province. The Ministry of Education recognizes its responsibilities towards students in the province, and the Ministry of Consumers Affairs recognizes its duties to the consumers. Why can't the Ministry of Agriculture recognize its responsibilities toward its future farmers.

Until the MAQ accepts this responsibility and starts supporting the rural youth in this province by investing time, effort, and money in it, any viable form of Young Farmers provincial structure can be nothing more than a dream.

The rural youth in this province have been getting a raw deal for too many years, and they are slowly becoming aware of this fact. As soon as the MAQ realizes that Quebec rural youth has the same rights and needs as rural youth across the country, and does something about it, then maybe we can all start doing a job that should have been started 50 years ago.

Joanne Enright
Secretary-Manager, QYF
and
Martin van Lierop
Editor

It's the biting fly season again!



A common Quebec horsefly.

by Professor David J. Lewis,
Department of Entomology

Mosquitoes, black flies, horse flies, deer flies, and sand flies (or "no-see-ums") are known to us all; most of us, and our domestic animals and livestock, have been subjected to the attack of these flies at one time or another simply because we inhabit one of the most productive biting fly countries in the world. In Quebec there are more than 40 different mosquitoes, 40 different black flies and over 70 different horse flies, and deer flies. Females of most of these insects feed, at least occasionally, on the blood of mammals or birds. Conservative estimates indicate that there may be in excess of 100 different sand flies in Quebec; fortunately, few of these are known blood feeders.

Economic Importance of Biting Flies

Biting flies have received much attention globally due to their medical and veterinary importance — both by direct injury and transmission of disease organisms. In many countries, especially the tropics, mosquitoes are capable of transmitting diseases such as malaria, yellow fever, dengue, encephalitis, dog heartworm and elephantiasis. The most important pathogen transmitted by black flies is a worm that causes onchocerciasis, known in some areas as "river blindness". One of the black flies responsible for the transmission of this disease is rather appropriately named *Simulium damnosum*. Black flies have long been recognized as carriers of a variety of blood diseases to domestic and wild birds. Deer flies and horse flies are capable of transmitting diseases such as ularemia, anaplasmosis, hog cholera, infectious anemia, and a variety of blood diseases. Sand flies are known to transmit blood diseases, the virus of bluetongue,

and the causative agents of fistulous withers of livestock.

These biting flies are relatively unimportant in Canada as carriers of disease, yet they are responsible for incredible losses in time and money annually. Biting flies are a nuisance to the avid recreational outdoors person, and in some areas create serious problems for the farmer. With repeated attack and feeding by biting flies, cattle gain less weight, dairy cattle produce less milk, and chickens lay fewer eggs — all because these animals spend considerable time fighting the flies rather than feeding. Industry has been affected too; more than once fruit picking, haying operations, logging camps, mining activities, and construction projects, such as road building and hydro developments, have been closed or slowed down by the activity of biting flies. Outbreaks of black flies in western Canada, especially in Alberta and Saskatchewan, have killed domestic livestock or reduced their productivity on numerous occasions. Mosquitoes in recent years have also had a significant impact on the health of man and his domestic livestock; equine encephalitis, usually a disease of horses, has been transmitted to humans in the Prairie provinces and Ontario.

Life Cycles

All of these biting flies have four stages in their life cycle: egg, larva, pupa, and adult.

Female mosquitoes lay their eggs in or near stagnant water; the immature stages (larva and pupa) are restricted to standing waters ranging from temporary roadside ditches to the margins of permanent lakes and marshes. The larvae, commonly known as "wrigglers", require one to three weeks for development, while the pupae, or "tumblers", require about three to four days.

Female black flies lay their eggs in or near running waters; black fly larvae and pupae are found only in running waters — including small temporary streams and large permanent rivers. The duration of the larval stage lasts from about two weeks to seven months; the pupae develop in as little as three days.

Female horse flies and deer flies lay their eggs in masses on vegetation above water or moist soil, but sometimes rocks and logs will serve as suitable egg-laying sites. Immatures of most horse flies and deer flies develop in aquatic or semi-aquatic habitats (stream banks, lake margins, bogs), but some are found in relatively dry soil or rotten wood. Larvae require about a year for development, but the pupae take about one to three weeks.

The habitats for egg-laying and larval and pupal development of sand flies is quite similar (and equally variable) to those of horse flies and deer flies. The duration of the larval and pupal stages is also similar to the development time of immature horse flies and deer flies.

The duration of the various biting fly larval and pupal stages depends upon the species, the temperature

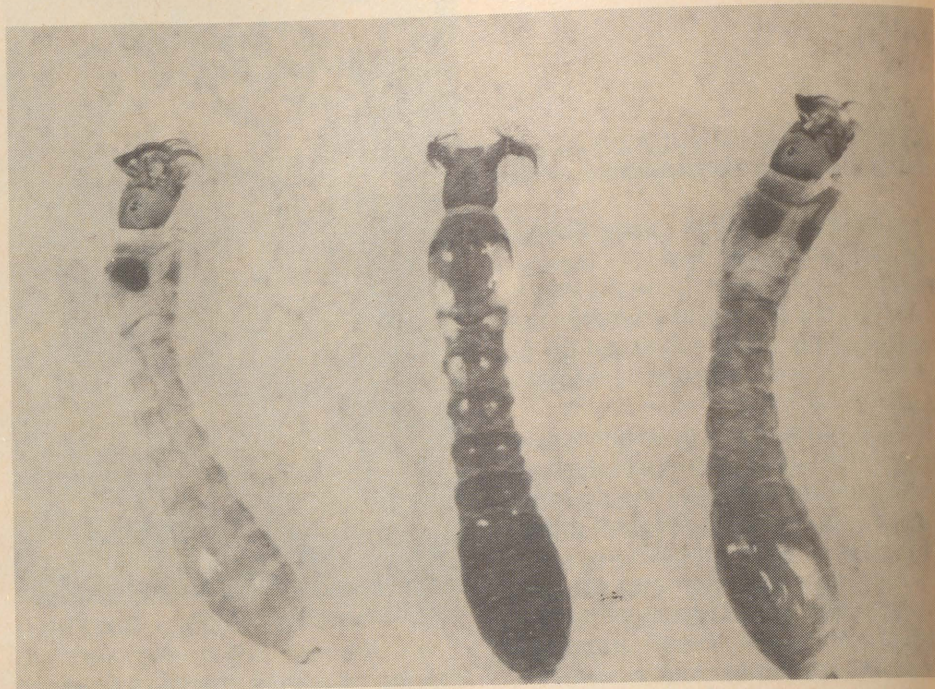
of the habitat in which they develop, and the availability of nutrients. Regardless of the type of habitat required for the immatures, the adults are all two-winged flies, the females of which may seek a blood meal. Both males and females can survive on plant juices, but, if the female is to manufacture and lay eggs, she requires additional nutrients, which she obtains from blood. There are exceptions — some female biting flies do not require a blood meal since they have retained sufficient nutrients from their larval stages. The males do not feed on blood; in fact, they cannot because their mouth parts are not adapted for this purpose. The males of most biting flies live for about a week, but the females may live for several months, take several blood meals, and lay several batches of eggs during this time.

Most mosquitoes overwinter in the egg stage, although the females of some species are known to overwinter. Black flies overwinter in either the egg or larval stage; horse flies, deer flies, and sand flies usually overwinter in the larval stage.

Many mosquitoes, black flies, and sand flies have several generations annually, but there are certain species that have only one generation per year. Horse flies and deer flies usually have one generation annually, and some species require two to three years for complete development.

Attacking behaviour

Mosquitoes and sand flies are primarily nocturnal; most females seek a blood meal during or between dusk and dawn. Both of these groups of flies are attracted to light and, since sand flies are small enough to pass through screens, they may become pests indoors during the evening. Black flies, horse flies, and deer flies are basically active in the daytime and are seldom encountered after dusk. Black flies may be especially bothersome on cloudy warm days, whereas horse



Above: mature black fly larvae. Below: cattle group together in self-defense.



flies and deer flies are most active on warm sunny days when there is no wind.

Mosquitoes and sand flies feed indoors and outdoors, but black flies, horse flies, and deer flies feed only rarely indoors. The activity of all of these biting flies is intimately associated with local meteorological

conditions. Slight changes in air temperature, wind velocity or relative humidity may significantly suppress or enhance the activity of biting flies. They are particularly active before and after storms. It is generally agreed that our reaction to the bites of biting flies is caused by an allergy to the saliva injected by the fly during feeding. The saliva

prevents the blood from clotting and frequently causes itching.

Protection

Before we can adequately protect ourselves (and domestic animals and livestock) from biting fly attack or institute some form of control in areas where it may be necessary, we must know the specific identity of the flies which constitute the problem and have an understanding of their biology — including behaviour.

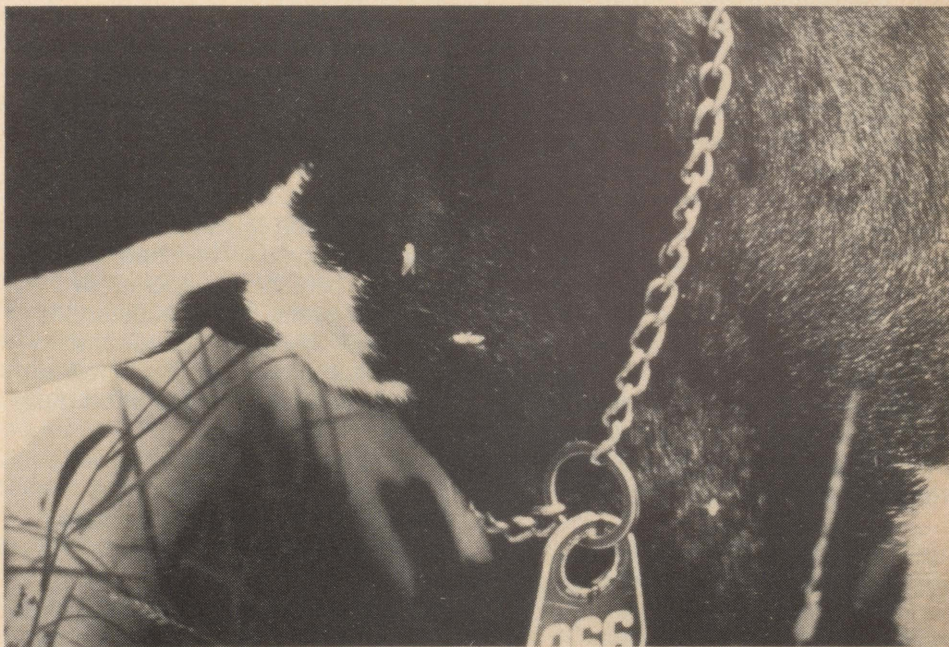
Why and how are biting flies attracted to animals?

Female biting flies approach their animal host not by accident but by responding to certain visual (sight) and olfactory (smell) stimuli. Perhaps the best known stimuli are carbon dioxide and colour. All animals exhale carbon dioxide, and since biting flies positively respond to this substance, then all animals are capable of attracting biting flies. The hiker, camper, picnicker, or fisherperson frequently ponders why biting flies are so numerous in an area that he/she has entered. Biting flies have simply followed a trail of carbon dioxide. An increase in the concentration of carbon dioxide, either by rapid breathing or by the presence of several people, will increase the attractiveness for biting flies.

Colour is also important; most biting flies are attracted to dark colours, especially blue and black, and are least attracted to lighter colours such as beige. Most people, perhaps unknowingly, attract biting flies simply because they choose to wear blue denim when in areas of biting fly production. Movement also increases the attraction of biting flies; a person remaining still will attract fewer flies than a person moving about. Moisture raises the attractiveness for biting flies; a person with wet clothes will be several times more attractive than a person in dry clothing. Often associated

with wet clothing is perspiration. Perspiration from under the arm is often attractive, but perspiration from the forehead is not. This demonstrates that female blood-seeking flies are capable of responding to specific components of perspiration — components found in some perspiration but not in others. It is also thought that there may be rather specific attractive factors in the blood stream, thus some people are subject to greater biting fly attack than others. External skin temperature is also important in attracting flies; warm skin of about 31°C attracts more blood-sucking flies than cooler skin of about 29°C. Darker skinned individuals generally attract more flies than lighter skinned people with similar skin temperatures.

Predominantly dark cattle in a herd generally have more flies feeding on them.



What can we do to decrease the attraction of biting flies?

That's easy! Simply don't breath, move or perspire, and wear light coloured clothing! Whenever possible we should avoid entering infested areas at time of biting fly activity. Of course it is not always possible to do this. Relatively good protection



Above: mosquitoes prefer to feed at night while (below) horseflies feed in bright sunlight.

can be provided by wearing proper clothing. Shirt sleeves and neck should be closely fastened and trousers should be tucked into socks or boots. Zippers on clothing would be much better than buttons on clothing, especially for keeping the black flies and sand flies out. Zippers are not as important for mosquitoes, horse flies or deer flies,

since these insects will bite directly through the clothing. Certainly light coloured clothing is least attractive; clothing may be made more protective by treating it with repellent.

Repellents — are they really any good?

Yes — if used properly. Repellents should be applied thinly and evenly to all exposed areas of the body. The best all purpose repellent chemical available is diethyltoluamide (sometimes written as N,N-diethyl-meta-toluamide, or deet). The concentration of deet in any given commercially available repellent (whether stick, lotion or spray), will vary from about 6 to 95 per cent. The higher the concentration of deet in a formulation, the greater is its repellency.

With increased concentration there is increased cost, longer protection time, and therefore a decrease in the number of applications necessary. Two other effective chemicals are dimethyl phthalate and ethylhexanediol. A recent introduction on to the consumer market is the repellent-impregnated jacket. These jackets are made of a lightweight, wide mesh fabric and have been designed for use as overgarments. The fabric absorbs fluid insect repellent and releases it slowly as a vapour. When not in use, the jacket is kept in a plastic bag; jackets may be re-treated with repellent in the plastic bag.

Before selecting a repellent or repellent-impregnated jacket for use — smell it! Many people are annoyed more by the smell of a repellent formulation than by the attack of biting flies!

What can be done to decrease biting fly attack on livestock?

Proper identification of the biting flies attacking livestock is required before specific protective or control measures can be implemented. Some biting fly populations may be reduced by eliminating their breeding areas. For example, fill in temporary or permanent ponds or pools; ditch and/or drain swamps and similar unused wetlands; do not leave surplus irrigation water lying on the ground. Mechanical elimination of breeding areas is, of course, permanent.

Chemical control of either immatures or adults, although "frowned-on" by many people, is the only alternative in some areas. The use of larvicides is preferable since adulticides offer only temporary relief. Chemical control is effective only if properly planned by personnel with a thorough understanding of the pest and of the action of the specific pesticide to be used. Breeding localities must be correctly identified, treatments accurately timed, and dosages carefully determined. Insecticides and repellents (and mixtures of both) may be sprayed or brushed on the animals daily, or self-applied by livestock oilers. These substances have been designed for specific insect pests and, while they show promise, their effects are of short duration.

Are there any natural enemies of biting flies?

Yes, the immatures and adults of all our biting flies have naturally occurring enemies. Immatures are eaten by a variety of organisms, especially other insects and fish. In some rivers and streams the diet of trout may consist entirely of black fly larvae. Adult biting flies are consumed

in large numbers by robber flies, dragonflies, and insectivorous birds such as swallows and purple martins; however, they do not feed exclusively on biting flies.

Various types of bacteria, fungi, roundworms, and other organisms are important in reducing the populations of biting flies in localized areas. Researchers in biting fly laboratories all over the world are currently conducting experiments with the ultimate aim of mass producing these organisms for subsequent release in areas of biting fly infestation. Generally, these "control" organisms develop within the body of the larva or pupa and eventually cause the death of the insect; the infected larva or pupa usually never reaches adulthood.

There has also been considerable investigation into the genetic control of biting flies. There are several mechanisms for genetic control, the best known being the sterile-male technique. This technique is based on the sterilization of male flies by the use of chemicals or radiation, and the subsequent release of these males into nature to mate with the females. Females will produce eggs, but they won't hatch! Genetic methods of control are concerned more with birth rather than death control.

Other methods of protection

Commercially available light traps, electrocuters, and repellent lights are frequently economical to operate and are environmentally safe; they are of limited usefulness indoors, but are relatively ineffective in reducing biting fly annoyance outdoors. Insect strips are effective only in confined areas and are unsatisfactory for providing relief from biting flies outdoors.

Fibre-Protein Interaction

by Professor B. DeLorme,
Department of Animal Science

Dietary fibre, up until quite recently, has been considered to be an inert and insignificant part of man's diet, largely because it was thought to contribute little to it, nutritionally. However, the role played by fibre in health and disease has recently become the subject of increased scientific and public attention as epidemiological data implicate its lack in a broad spectrum of diseases. These include, in addition to constipation with which it has traditionally been associated and sometimes as a result of it, diverticulitis, ulcerative colitis, appendicitis, hiatus hernia, hemorrhoids, varicose veins, cardiovascular disease, coledithiasis, and cancer of the colon.

The role of dietary fibre in the maintenance of health is the result of specific physical and chemical properties which in turn determine its physiological effects. Of particular interest are its ability to hold water, its adsorptive and ion exchange capacities and its susceptibility to fermentation by colonic bacteria. These functions vary according to the structure and composition of the fibre and therefore its food source.

DEFINITION AND PROPERTIES

What then is dietary fibre? It is a rather ill-defined group of polysaccharides usually taken to include cellulose, hemicellulose and pectin as well as lignin, which is not a polysaccharide *per se*. They have in common that they originate for the most part from plant cell walls where they act as structural components and that they are not hydrolyzed by the digestive enzymes which an animal secretes into its digestive tract. They therefore reach the large intestine intact. The precise types and proportions of these component fractions of dietary fibre depend on the types of foods that are consumed. This then determines the physiological effect which that food will exert within the gastrointestinal tract.

Fermentation and bacterial populations

It should be pointed out that after the dietary fibre reaches the large intestine it is then exposed to attack by the microflora of this region and can be digested to varying degrees by bacterial enzymes. Factors influencing digestibility in the colon include the resident microbial population, the physical structure and chemical composition of the fibre, in particular its lignin content, and the length of time the food residue remains in the gut. Various studies have shown that 29 to 82 per cent of ingested cellulose, 56 to 87 per cent of hemicellulose, 90 per cent of pectin and none of the lignin disappear during passage through the gut. Some of this fibre is changed into volatile fatty acids which are absorbable at least in part. Thus, fermentation of dietary fibre in the colon can make a minor contribution to the energy value of the diet. However, it is likely that the major effect of these volatile fatty acids is by way of some contribution to the laxative effect of fibre, possibly through an osmotic effect, increasing the water content of the stools and inducing a higher rate of peristalsis.

Conversely fibre, acting as a substrate for bacterial growth, influences the microbial populations of the large intestine both as regards numbers and species. This last effect then determines the types and amounts of various products of bacterial degradation to be found in the feces. This in itself has important implications in metabolic and colonic function and health.

Water-holding capacity of fibre

The hydration of fibre occurs by the adsorption of water to the surface of the fibrous particles and its entrapment within the interstices of these macromolecules. The water-holding capacity of the fibre is influenced by several factors, including the physical and chemical composition of the fibre, the presence of polar groups and cross-links, conditions in the surrounding medium, cooking and the size of the particles (finely ground bran holds less water).

The extent to which a fibre or fibre source can be hydrated determines its effect on fecal weight and bulk and on stool weight. Because of their hydrophilic capacity, hemicelluloses are most efficacious in this regard and cellulose somewhat less so. Lignin is hydrophobic and thus constipating. Pectin, although it forms gels with high water content *in vitro*, is largely degraded by bacterial action in the colon, so that it does not increase the water content of the feces.

As the water content of the feces increases, they become softer and more bulky. This relieves constipation, lessens the transit time (time necessary for food residues to move through the entire gastrointestinal tract and pass out in the feces), decreases the amount of effort required to move the intestinal contents down the length of the intestine and that required for defecation. As a result, pressures would decrease within the lumen of the intestine, within the intestinal wall, and within the abdominal cavity. This is thought to be related to the lower incidence of diverticulitis, hiatus hernia, ulcerative colitis, appendicitis, and varicose veins found in populations consuming high fibre diets.

Entrapment

The swelling of fibres with water creates networks trapping electrolytes and organic acids in the colon. Presumably, these osmotically active particles in the fibre network create electrical charges which influence further imbibition of water.

It is also quite plausible that dilution and entrapment of nutrients within the intestine by fibre would slow their absorption. This would then be reflected in the metabolic load placed on the organism in the period immediately following meals and may have some implications in diseases such as diabetes mellitus.

Adsorptive properties of fibre

Organic compounds may be adsorbed directly to fibre. Of these

compounds, the bile acids have been the most extensively studied, although the excretion of other organic molecules and toxins may be increased in this way also.

An increased loss of bile acids in the feces would necessitate an increased rate of synthesis for replacement, drawing on body cholesterol stores and changing the relative proportions of the different bile acids secreted. This effect of dietary fibre is thought to play a role in diminishing blood cholesterol and in reducing the incidence of cardiovascular disease and gallstones.

Cation exchange properties

Dietary fibre seems to act somewhat like a weak ion exchange resin in binding mineral elements, thus modifying their absorption. Whether or not this causes problems would depend on the amount and types of fibre and the adequacy of this mineral element in the diet, as well as the long-term adaptive capacity of the organism.

What about an Excess?

It is thus increasingly likely that there are definite health advantages — in the form of a reduced incidence of a rather impressive number of maladies — associated with higher levels of fibre in our diets.

The question which arises at this point is: what about over consumption? When is enough enough? There is no doubt that many valuable and essential nutrients can be harmful when fed in excess or out of proportion with other elements of the diet. Add to this that dietary enthusiasms tend to run to extremes, and we can see that problems could conceivably arise if dietary fibre consumption is overdone. This does not make these nutrients, including dietary fibre, any less valuable when fed at the correct levels. It does, however, justify an investigation of any deleterious effects of very high fibre consumption.

Mineral elements

Such investigations have been made mainly as regards the effect of high dietary fibre intakes on electrolyte and mineral element balance, particularly those of zinc, iron, calcium, copper, and magnesium. Present data seem to indicate that if the increase in dietary fibre is reasonable rather than excessive, and that if proper care is taken to provide enough divalent cations (milk, for example), the problem of divalent ion deficiency is of little consequence in Western-type diets. However, it could be of major concern in developing countries where the dietary regime might be low in essential minerals and proteins and extremely high in plant products. Vegetarian diets, if totally free from products of animal origin, might also need proper supplementation. In short, it's unlikely that high dietary fibre intake could by itself precipitate a deficiency in any mineral element unless the intake of that mineral is already marginal or inadequate. Under these circumstances the situation might be exacerbated.

What about fibre's effect on protein?

From the preceding discussion, it is evident that dietary fibre may affect the way various nutrients are utilized by the organism. We know that dietary fibre increases the loss of nitrogen in the feces as well as that of lipids. This may occur by adsorption to the fibre or by incorporation into microbial matter. The problem to which we have addressed ourselves in the Crampton Nutrition Laboratory of Macdonald College is that of the effect of dietary fibre intake on the utilization of the protein in food by the normal organism.

We studied the effect of increasing levels of cellulose or pectin on the utilization, by weanling Sprague-Dawley rats, of protein of different levels of quality. This protein was either casein or bread protein, supplemented or not with lysine or lysine plus threonine, bread's most limiting amino acids.

THE EFFECT OF CELLULOSE ON PROTEIN UTILIZATION

1. Nutrient intake and digestibility

The introduction of a "non-nutritive" substance such as cellulose dilutes the digestible energy component of the diet. A number of researchers have shown that rats can make compensatory adjustments in food intake as the proportion of this non-digestible fraction in the food changes.

Our results indicate that this adaptation occurs only if the protein intake is adequate. When protein quality and quantity were both limiting, the animals were unable to adapt and the consumption of digestible energy and protein both diminished (Figure 1).

As was to be expected, the gross energy digestibility of the diet diminished in proportion to the amount of cellulose added. Thus, the digestibility of the non-fibre energy fraction was not changed by added fibre, and digestible energy intake depended directly on the non-fibre fraction.

Although non-fibre energy digestibility was not depressed by added fibre, protein digestibility was (Table 1), reflecting an increase in nitrogen excretion as the proportion of cellulose increased. As a result, the digestible protein diminished more than did that of digestible energy. It is thus clear that high-fibre diets interfere in some way with the apparent digestibility and absorption of protein.

2. Growth and PER

This effect on protein digestibility, however, was relatively minor. By itself, as long as the animals were able to compensate for caloric dilution, it had no effect on either growth or the PER (protein efficiency ratio) (Table 2). Where these values were low, low growth and PERs probably basically reflect an inadequate intake of both calories and protein, where a reduced digestibility exacerbates the situation.

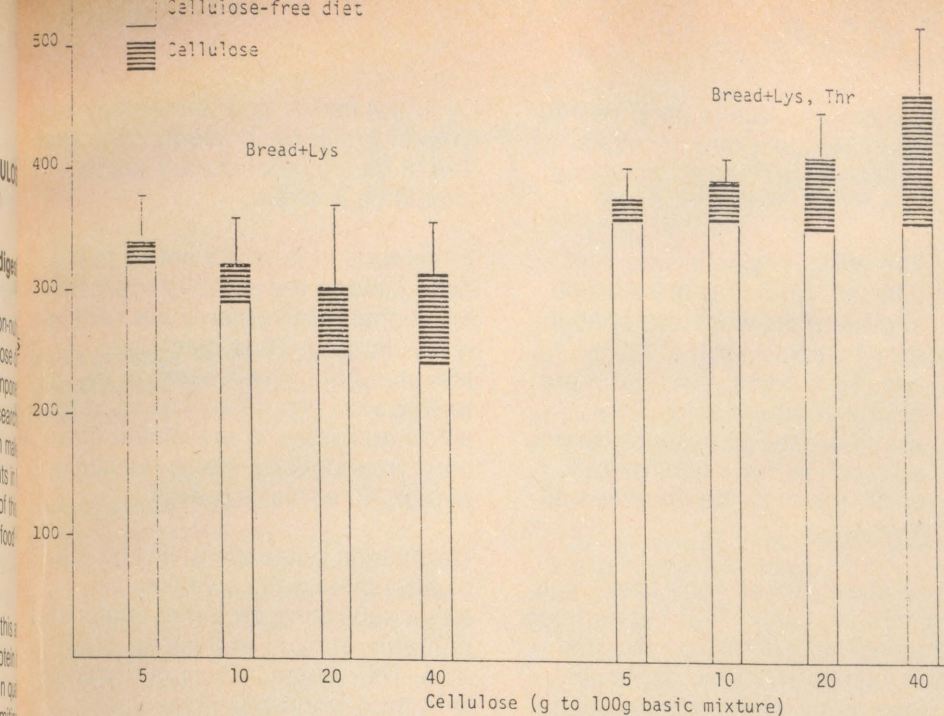


Figure 1: The effect of dietary protein quality and cellulose level on the feed intake of weanling rats.

In summary, we may draw two basic conclusions from this work on cellulose. First, high dietary cellulose affected the utilization of protein by increasing the proportion of dietary nitrogen lost in the feces. This was observable even with high quality protein, although these animals were able to compensate for caloric dilution by appropriate increases in their food intake, so that growth and PER did not suffer. However, if fed a lower quality protein, we see the second effect coming into play, and the rats were no longer able to compensate for this caloric dilution. As a result, the digestible energy and protein intakes diminished progressively as the cellulose content of the diet rose, resulting in lower growth rates, a less efficient use of protein and a greater degree of emaciation, as evidenced by a lower body ether extract.

PECTIN AND DIETARY PROTEIN

Preliminary results show us that pectin has a dramatic effect on growth and protein utilization which is very different from that of cellulose.

Over a range of protein qualities extending from that of casein to that of wheat, increasing pectin levels progressively diminished feed intakes and growth (Figure 2), so that at higher pectin levels, body weight growth was uniformly low, regardless of the quality of protein fed. As a result, the PERs and feed conversion worsened progressively as dietary pectin rose, so that at the higher pectin levels, protein was used with an efficiency approaching zero regardless of the quality of protein added to the diet.

Dry matter and gross energy digestibilities diminished with increasing pectin levels, as was to be expected, but protein digestibility also decreased, which can only be explained on the basis of an increase in fecal excretion.

These effects go well beyond those which would be expected if they were dependent only on caloric dilution. The simplest and most obvious

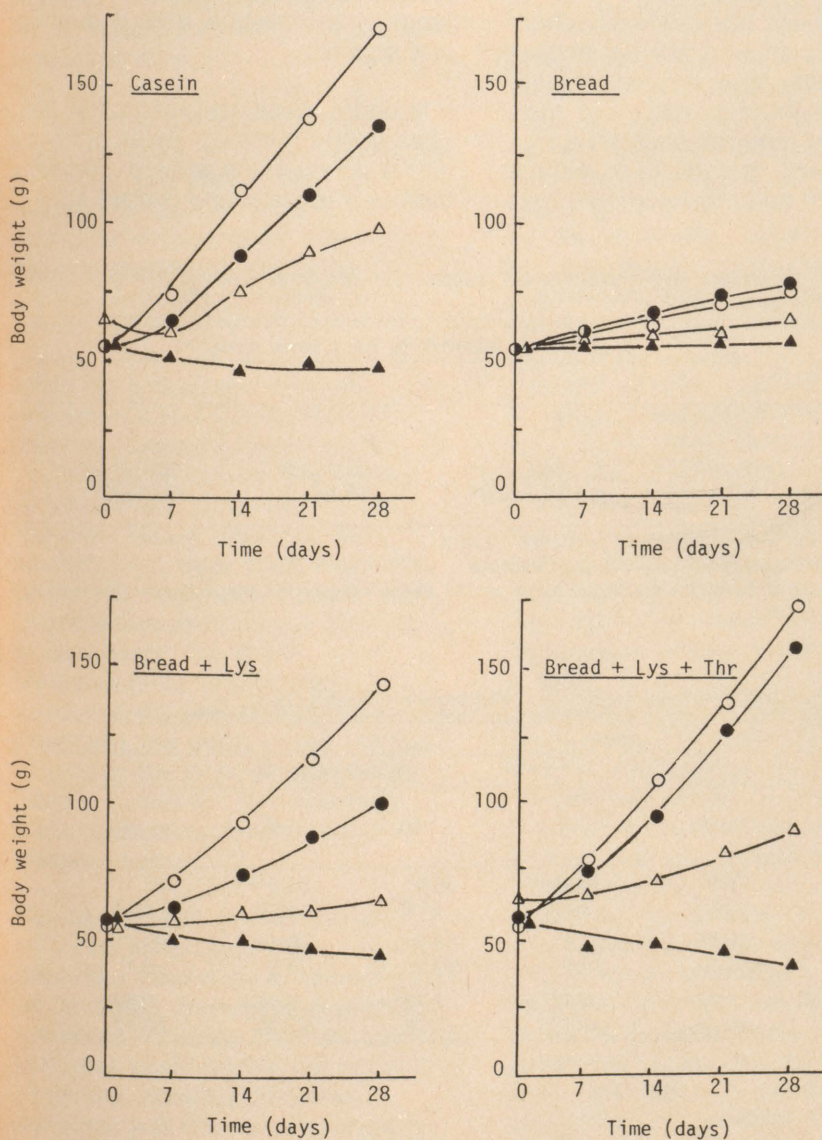


Figure 2: The effect of dietary pectin levels and protein quality on body weight growth in rats. (O) 0%; (●) 4.8%; (Δ) 16.7%; (▲) 28.6% pectin in diet.

interpretation would be that pectin may be inducing an amino acid deficiency or imbalance by binding specific essential amino acids. It should be remembered that pectin has been shown to bind bile acids and thereby increase their rate of excretion. It thus seems logical that this could be extended to other organic molecules such as amino acids.

Discussion

From these results, it is evident that dietary fibre influences the utilization of alimentary proteins. Further, comparing the effects of the two types used, it seems clear that the precise nature and extent of this effect depends on the type of fibre as well as its quantity. Different types of food cannot, therefore, be expected to have the same effect.

We can draw at least three conclusions from our results:

1. The ability to compensate for caloric dilution seems to depend to some extent on the adequacy of dietary protein
2. Dietary fibre increases the fecal excretion of nitrogen, diminishing the apparent digestibility of the proteins consumed. In the case of the higher quality proteins, when cellulose was used, this may be compensated by a lower urinary excretion, since growth and PERs were not significantly affected. It is likely that the marked decrease in both of these values with increasing dietary cellulose in the rats fed a lower quality

protein was due in good part to an inadequate caloric intake, as well as a low protein consumption.

3. The effect of pectin was very different from that of cellulose and the most likely explanation may be some form of fairly specific binding of one or more essential amino acids. This would create an essential amino acid deficiency which could easily produce the observed effects.

These observations have direct and pertinent implications in the nutrition of monogastric domestic animals and in human nutrition, particularly in those areas where human populations consume diets high in dietary fibre but low or marginal in protein (quantity and quality).

Based on these observations, where monogastric animals are fed diets high in dietary fibre, it is possible that the minimum quantity and quality of protein required should be adjusted upward, in order to obtain optimal growth and maximum efficiency

in the use of both the energy and protein provided. It seems clear that very high levels of dietary pectin should be avoided.

In humans, it is worth noting that diets used in the establishment of nutritional requirements are relatively low in fibre. Thus, because elevated fibre levels seem to interfere with protein utilization, it may prove advisable to reevaluate these recommendations where conditions of high fibre intake prevail.

The human populations having the highest dietary fibre intakes are those subsisting on a diet composed primarily of plant and cereal products. This situation occurs commonly in third world countries whose populations consume diets consisting of very high proportions of staples, such as grains or tuberous plants. The protein in these diets tends to be marginal both in quantity and quality.

It is under these conditions that the observation that high levels of fibre intake diminish the apparent digestibilities of energy and protein attain

Table 1. Effect of cellulose level and amino acid supplementation on apparent protein digestibility (%) of experimental animals.¹

Diet	Cellulose added (g to 100 g basic mixture ²)			
	5	10	20	40
Casein	90.3±0.8 ^a			
Bread	87.7±0.9 ^c			
Bread + Lys	89.1±0.7 ^{a,b}	86.9±1.3 ^{c,d}	83.6±3.2 ^e	83.0±1.2 ^e
Bread + Lys, Thr	88.3±0.6 ^{a,b,c}	86.2±0.8 ^d	83.1±1.5 ^e	81.1±2.1 ^f

¹ Each value represents the mean (±SD) for 10 rats.

² Basic mixture: dietary mixture without cellulose.

³ Means sharing a common subscript letter in the same column or row are not significantly different (P<0.05).

Table 2. Effect of amino acid supplementation and cellulose level on protein intake, weight gain and protein efficiency ratio.¹

Cellulose added (g to 100 g basic mixture ²)	Diet							
	Bread + Lys				Bread + Lys, Thr			
	5	10	20	40	5	10	20	40
Protein intake ³ (g)	34.9 ^{a,b} ±3.7	31.3 ^b ±5.3	27.2 ^c ±5.7	24.0 ^c ±3.3	36.1 ^a ±2.4	36.0 ^a ±1.5	34.2 ^{a,b} ±2.9	34.1 ^{a,b} ±3.6
Weight gain ³ (g)	63.2 ^{a,b} ±15.5	60.1 ^b ±15.2	45.3 ^c ±17.1	32.6 ^d ±10.0	97.6 ^a ±6.9	98.3 ^a ±9.3	98.1 ^a ±14.2	91.7 ^a ±9.1
PER ⁴	1.79 ^{a,b,c} ±0.30	1.90 ^b ±0.27	1.63 ^c ±0.37	1.33 ^d ±0.25	2.71 ^a ±0.10	2.73 ^a ±0.22	2.86 ^a ±0.22	2.69 ^a ±0.12

¹ Values represented the mean (±SD) for 10 rats.

² Basic mixture: dietary mixture without cellulose.

³ Represent a 28-day protein intake and weight gain.

⁴ Protein efficiency ratio (PER) = $\frac{\text{weight gain}}{\text{protein intake}}$

⁵ Means sharing a common subscript letter in the same row are not significantly different (P<0.05).

(Continued on page 13)

MEET THE CLOUDS

by Professor R. H. Douglas
Department of Agricultural
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The first published classification of clouds dates back to 1802, the work of the celebrated naturalist J. B. Lamarck in France. Unfortunately, Lamarck's classification made little impression at the time, possibly due to the fact that it appeared in a publication which included somewhat disreputable forecasts based on astrology. Be that as it may, our present system stems from one devised in England by Luke Howard, one year later. It is of interest to note that the great English landscape artist, Constable, at this time had developed a keen appreciation of the role of the sky in his landscapes, as far as setting the key mood was concerned; he interested himself in Howard's classification and spent many hours painting observant and discerning studies of clouds in their different forms.

While the years have brought refinements and clarification of detail to Howard's classification, its basic features remain even today very much as he conceived them. The most recent changes and modifications have been made first by the International Meteorological Organization, then (since 1951) by its successor, the World Meteorological Organization, an agency of the United Nations. Observers the world round are able to consult the International Cloud Atlas to insure an internationally understood uniformity in cloud classification.

Clouds probably display as bewildering an array of form, colour, behaviour (and even temperament) as do plants, insects, and animals (including humans). But they can be, and have been, sorted out according to genera, species, and even varieties; and the nomenclature is rooted in Latin, just as Lamarck's and Howard's were. The genera find

day-to-day usage in the observational networks — species and varieties being resorted to only in relatively few of the more important cases.

There are ten genera, subdivided according to the three general heights at which they occur, these being quite simply high, medium, and low. At the high levels we find the genera cirrus, cirrocumulus, and cirrostratus; at the middle levels we find altocumulus and altostratus; and at the low levels, stratus, cumulus, stratocumulus, nimbostratus, and cumulonimbus.

The cirrus clouds are the fine silky-white tufts and threads of ice crystals, often transparently thin, but occasionally fairly thick and substantial. Cirrus itself often appears as "mares' tails". Cirrocumulus is white, lumpy (hence the "-cumulus", a heap or pile), even flakey; the "mackerel sky" is an excellent example. And cirrostratus is a white veil or sheet (hence "-stratus", spread out), sometimes so thin as to be virtually invisible, at other times dense and milky. The giveaway for cirrostratus is the halo which it produces around the sun or bright moon. The halo is circular around the sun or moon, like a rainbow but with the red on the inner edge, violet on the outer; the angular radius of the halo is about 22° , but the halo may be an incomplete circle if the cloud is not continuous. Even when the cloud is too thin and transparent to be seen, the halo will reveal its presence, for the halo is the result of refraction through the ice crystals which comprise the cloud. The cirrus-type clouds are fairly common, but are only really important when they increase in sky coverage and thicken up ahead of an approaching low-pressure system; hence the observation that a ring around the sun or moon (the halo) signals the approach of poor weather (the low pressure area). Illuminated from below by the setting sun, the cirrus

family is responsible for our most beautiful sunsets.

The middle-level clouds are thicker and greyer, comprising ice crystals and/or water droplets. Altocumulus ("middle, heaped or piled up") have larger "lumps" than cirrocumulus, sometimes arrayed in parallel bands, sometimes in a sort of checkerboard pattern. In an otherwise clear sky they may be shaded grey and white, like wads of cotton wool; but if they are relatively thick, they may look quite dark. Altostratus is a mid-level sheet of cloud, usually grey and showing relatively little relief. If it is thin, the sun shines through dimly as if through ground glass. The alto-clouds sometimes yield modest amounts of rain or snow but are not the major producers of our precipitation, although if they thicken and lower enough to be classified as nimbostratus, then precipitation can be substantial, widespread, and persistent.

The low clouds fall naturally into two main types, stratiform (extended) and cumuliform (lumpy). Stratus is thin fog-like cloud (in fact stratus, based on the ground, is called fog; once fog "lifts" it becomes stratus) extending in grey sheets, sometimes fragmentary; it may produce fine drizzle or inconsequential snow. It is the curse of airlines, producing low ceilings and (accompanied by fog) poor visibilities. Nimbostratus ("rainy sheet") is more extensive, much thicker, and is the major generator of widespread and persistent rain or snow. It can only be described as a homogeneous dull drab grey sheet, with virtually no visible features or relief on its underside (so a photograph of it usually comes out like an accidentally-exposed film — this cloud is notably non-photogenic).

In contrast, the cumulus family is supremely distinctive, the members are definite individuals, always mobile. Whereas the stratiform clouds are the product of relatively



Left: the top of a towering, approaching thunder-cloud, or cumulonimbus. The top spreads out at the base of the stratosphere at a height of 10 to 15 kilometers. Below: Altocumulus in rolls or bands. Each individual cloud is an indication of upward motions. Opposite page: A prairie thunderstorm in profile, showing the typical anvil form of the cumulonimbus. Such clouds provide the pumps which distribute heat and moisture vertically through the lower atmosphere.

gentle upward motion in stable air, cumulus is the result of convection, which is the strong upward motion of thermal bubbles and chimneys, the result of instability. Indeed it is the rising bubbles of warm air which give to cumulus its characteristic cauliflower-like contours. The motion is so pronounced that it is clearly visible as we watch the swelling and bulging of these hyperactive clouds. The babies of the family are the fair-weather-cumulus of the pleasant summer day, with rounded tops and flat bases. They develop as the day warms up, and die as the sun goes down and the earth cools. Given the proper conditions, they may swell to great height and breadth, with perhaps several smaller ones joining forces to produce a larger one, even sometimes a row of them; such "cumulus congestus" is now capable of producing showers.

The giant of the family is the cumulonimbus, the thundercloud, whose top flattens and spreads out laterally at the base of the stratosphere, eight or more miles aloft. This spreading out produces the familiar profile resembling an anvil; indeed the upper portion is called an anvil-top. Tall cumulus, and especially the cumulonimbus, contain inside them a mixture of rain, supercooled drops (liquid water drops at temperatures below freezing), and ice. The spreading anvil of the thundercloud is ice, like dense cirrus, often extending many miles around the main cloud below, especially downwind.



The lifeblood of the cumulus family is the warm moist air which rises into the clouds, often at high speed. The active rain stage is accompanied by downdrafts as well, which reach the ground as squally winds. Needless to say, such clouds, with their up-and-downdrafts, are to be avoided by aircraft.

With the cutting-off of the vital up-drafts, due perhaps to evening cooling, or even because of the rain-induced downdrafts, these clouds almost literally collapse, leaving cloudy debris at all levels, to gradually evaporate. Thus the almost chaotic mixture of cloud-fragments at all levels (now called, for example, altocumulus "cumulogenitus") which remains after a thundercloud has spent itself. Since ice-crystals evaporate less

quickly than water droplets, the cirrus remains of the anvil may persist for many hours following the otherwise complete decay of a cumulonimbus.

The last — and perhaps most common — member of the low clouds is stratocumulus. This cloud manages to combine the lumpy appearance of cumulus with the layered aspect of stratus, for it is a broken layer of slightly lumpy cloud. Whatever precipitation it produces is spotty, negligible in amount.

A few of the more common and distinctive species are worth mentioning. Altocumulus "castellanus" is middle level cloud, with tall narrow turrets resembling the battlements of a castle. Seen usually



early in the day, and not persisting for long, it is a sure indication of mid-level instability, suggesting the strong possibility of strong cumulus development later in the day, often climaxed by deep thunderstorm activity.

Another species is related to altocumulus and stratocumulus. These are the lenticular, or lens-shaped species of these clouds, which sometimes appear in layers one above the other, rather like a stack of pancakes. These are related to topography, where hills or mountains set a strong wind-flow into a wave-like motion downstream, like the waves and ripples below a rock in a flowing stream. The cloud caps each wave-crest downstream from the high ground. Being related to a hill or mountain, these clouds do not move, although the wind may blow strongly through them. They are frequently visible around Montreal, over the Laurentians, and Adirondacks. Sailplane pilots recognize them (as well as cumulus) as indicators of upward motion or lift, although they may produce a turbulent ride.

A more common type of topographical cloud is that which forms on windward slopes, due to upslope winds. The familiar example is stratus, clinging to the hillside like fog. In unstable air forced upslope, cumulus may develop. In the extreme case, windward slopes of mountain ranges in prolonged situations of suitable airflow can be generators of almost all the cloud genera, resulting in extensive and

persistent precipitation. Elsewhere, though, extensive cloud and precipitation are associated with the gentler ascent of warm moist air forced to rise over shallow wedges of colder air at the warm and the cold fronts of our latitudes; or, more commonly in summer, with the showery conditions of unstable air which produce local cloud of the cumulus family.

Clouds, by their form and motion, development and decay, reveal the character of the local atmosphere. To anyone whose livelihood depends on them, or who simply enjoys their enrichment of the natural environment, a nodding acquaintance (or, better yet, a familiar knowledge) is well worth-while.

(Continued from page 10)

their full import. Decreased absorption would not be a problem when the intake of these nutrients in the diet is sufficiently high but might be of concern in areas such as the developing countries, where the level and quality of protein in the diet tend to be marginal or low for large segments of the population and where a large percentage of the calories consumed may come from high-fibre foods.

We wish to stress that any deleterious effects were obtained with cellulose only with large amounts and where protein was marginal both as to quality and quantity. In the case of pectin, high protein quality seemed no protection against its effects, but it should be

pointed out that the level of protein in the diet was still limiting and it is possible that greater amounts might have had a protective effect. We plan to verify this in subsequent experiments.

CONCLUSION

Dietary fibre has been shown on the whole to have definite beneficial effects on health. What the present results really show is that any increase in dietary fibre should be in balance with the other constituents of the diet and possibly that it should be obtained from a number of sources so that no single fibre type predominates unreasonably. Our main recommendation, then, is one of moderation, avoiding both very high and very low levels. There certainly must be a wide middle range of permissible intakes which avoids the problems of either extreme. We have shown that very high levels of dietary fibre may have some detrimental effects, but this can be said of many essential nutrients and is no reason to pass up the beneficial effects of moderate levels of consumption.

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The Family Farm



Published in the interests of the farmers of the province by the Quebec Department of Agriculture.



ASSISTANCE PROGRAM FOR THE MODERNIZATION OF MAPLE SAP COLLECTION: ANALYSIS OF THE SITUATION

by Josée de Grandmont,
Agronome

To encourage the modernization of maple sap collection, the ministère de l'Agriculture du Québec launched a program in 1977 to subsidize the purchase and installation of a tubular system called "Sysvac" (vacuum operated). This financial and technical aid, at first applied on a regional basis, was extended throughout Quebec in October, 1978, and at the same time prolonged for a five-year period.

The number of maple syrup producers who took advantage of this program in the fiscal year 1978-1979 increased to 685 for a total amount of \$1,085,250 in subsidies. In 1977-1978, 272 producers had benefited by this financial aid and the subsidies granted to them amounted to \$329,981. It will thus be noted that, compared with last year, there has been a big expansion of the assistance program for the installation of "Sysvac" in maple groves this year and it is believed that the expansion will continue because the ministère de l'Agriculture intends to devote \$5 million to the implementation of the program.

Nature of the assistance granted to maple syrup producers

It is to be noted that financial aid under this program consists in a payment of a subsidy of 75 cents per tapping connected to a "Sysvac" system. In the case of a producer who already owns a tubular system, the minimum of new tappings required is 500 whereas, in

the case of a producer who is using this system for the first time, it is 1,000. In both cases, the maximum number of tappings subsidized is 10,000. Technical aid under the program consists in recruiting, hiring, and remunerating technicians trained by the Maple Products Division of the ministère de l'Agriculture du Québec to install "Sysvac".

"Sysvac" and its advantages

The system of sap collection under vacuum through plastic tubing seems to be the most practical means of collecting the sap and bringing it to the sugar house. It makes up for scarce and expensive labour and does away with tedious work.

The system consists in connecting the tappings in the maple trees to a conduit of plastic tubing. Near the tappings, this tubing is of relatively small diameter and it is next connected to larger tubing which brings the sap to the sugar house. The system has been improved by adding a "Sysvac" vacuum pump. The vacuum favours an earlier flow in the spring, a more rapid start of the flow in the morning, a more abundant flow in the daytime, and a later cessation of the flow at night. Moreover, the imperviousness of the system delays the drying up of the tapping.

The vacuum collecting system has the following advantages over the conventional methods:

- double yield per tapping;
- better quality syrup;
- earlier tapping in the spring

- stabilization of annual production;
- less work hours per pound of syrup produced;
- improvement of working hours;
- increase in the income derived from the maple grove.

A few years ago, the maple industry was losing momentum in Quebec, mainly because of poor marketing and problems due to conventional production methods. These problems, such as scarce and expensive labour, irregular collections and somewhat unsatisfactory yields, have been solved by installation of a vacuum collection system of maple sap ("Sysvac"). It is therefore easy to understand why the ministère de l'Agriculture du Québec grants financial and technical aid to those who wish to modernize their enterprise by installing this system in their maple groves. Quebec now accounts for 90 per cent of Canadian maple syrup production and 70 per cent of world production. It is an enviable position and we owe it to ourselves not only to keep it but also to improve it as the years go by.

Summary for the year by regions

The following table shows the geographical distribution of the producers who benefited by the program during 1) the 1977-1978 fiscal period and 2) during the 1978-1979 period and the amount granted in each region.

This table reveals the increasing popularity of the program with maple syrup producers. It is in the Beauce region (Saint-Joseph) that we find the greatest number of producers (in both these fiscal periods) who availed themselves of this aid. Maple syrup products account for a big percentage of the farm income in this region.

Region	1977-78		1978-79	
	Producers	Amount	Producers	Amount
Rimouski	6	\$ 8,600	16	\$ 32,850.00
Sainte-Foy	35	40,055	92	159,953.75
Saint-Joseph	158	178,066	324	497,455.00
Nicolet	25	27,200	73	112,387.50
Sherbrooke	28	30,650	81	147,932.50
Saint-Hyacinthe	8	7,310	17	21,000.00
Chateauguay	5	7,050	10	12,875.00
Buckingham	4	2,300	14	16,687.50
L'Assomption	22	27,600	48	74,043.75
Cap-de-la-Madeleine	1	1,150	8	9,325.00
Alma	—	—	1	750.00
TOTAL	292	\$329,981	685	\$1,085,250.00

Source: Service des subventions et primes
Ministère de l'Agriculture du Québec

TO OBTAIN HIGH QUALITY HAY: A MATTER OF MANAGEMENT

Under normal conditions, high quality hay may be the least expensive source of energy and protein for sheep and cattle. Therefore, the farmer has good reason to pay special attention to his haymaking and grassland management.

It is important to be aware of the four main factors which greatly influence the nutritional value of hay.

These factors are:

- the kinds of plants;
- the stage of maturity at cutting time;
- mechanical losses;
- loss of nutritional value from rain after cutting.

Kinds of plants

Legumes make better hay than cereals or grasses. They contain more leaves per kg of hay, which means more protein and digestible dry matter. At the ideal growth stage, the percentage of leaves is 30 per cent in timothy, 40 per cent in clover, and 55 per cent in alfalfa.

In order of value, the best plants for dry forage are alfalfa, clover, cereals cut at the green stage before maturity (greenfeed), grass hay, and straw.

Degree of maturity at cutting time

As the plant matures, the fibre content and forage yield increase, but the protein content and the digestibility of the dry matter decrease. Forage plant stems have

low nutritional value. The percentage of stems in hay increases so rapidly with maturation that a delay of only a few days in cutting results in considerable loss of nutritional value.

Hay intended for livestock feeding must meet certain minimum standards of quality. In the case of all harvested forages, at least 60 per cent digestibility and a protein content of not less than 10 per cent should be conserved. It is thus advisable to strike a balance between yield and quality. The stage of growth is the best way to decide the time to cut. Because of year-to-year variations, precise dates for cutting are not a safe guide. The stages of optimum growth for cutting the kinds of forage grown in Quebec are as follows below:

Legume-grass mixtures

These mixtures are mowed when the principal legume reaches the optimum stage of growth. For example, a mixture of timothy, alfalfa, and Ladino clover is cut as soon as the alfalfa starts to flower.

Pure Stands

Alfalfa
Red clover
Birdsfoot trefoil
Timothy

Bromegrass

Orchardgrass

Reed canarygrass

The degree of maturity of hay at cutting also greatly influences the quantity of hay eaten daily by livestock. The younger the plant, the more succulent it is and the higher the intake.

Mechanical losses

Losses during the hay harvest also influence the quality of hay. It has been shown that, under average conditions, there is a loss of about 20 per cent of the leaves and small stems from the time of cutting to the time of feeding; this loss is due to the handling. However, it is to be noted that losses in dry matter of field-dried hay are smaller for grasses than for legumes, such as alfalfa and clover. The more advanced the stage of maturity of the plants at cutting, the greater the losses. Here again, the advantage of cutting early in the season will be realized. A hay dryer also makes it possible to reduce losses in dry matter of the hay.

Loss of nutritional value from rain after cutting

Experiments show that losses caused by rain during haying may reach 65 per cent of the mineral matter, 35 per cent of the carbohydrates, and 18 per cent of the protein contained in the hay at cutting time. This is an enormous loss in feeding value.

In short, good hay must be cut at the stage of optimum growth, briefly wilted or "cured", and stored without having got wet. Such hay will have great nutritional value because it will be rich in protein, minerals, and vitamin A. Its digestibility will be high and it will be appetizing. Animals will eat more of it, make better weight gains, and thus give a better yield of meat or milk, as the case may be.

Stage of Growth for Cutting

First flowers
25 to 50 per cent bloom
25 to 50 per cent bloom
From heading to the beginning of flowering
From heading to the beginning of flowering
From the beginning to the end of heading
At the start of heading

MAKE ROOM FOR STRAWBERRIES!

by Josée de Grandmont,
Agronome

Every real gardener will make it a point of honour to grow strawberries in a vegetable garden. Strawberry growing is easy and requires little space. In addition, climatic conditions in Quebec favour this production. The lengthy days and weather conditions satisfy the needs of strawberry plants.

Location of the strawberry patch

Because of their comparatively permanent character, strawberry plants must be located so as not to hinder work in the vegetable garden. They should be at one end of the garden. The location chosen must have good air circulation in order to avoid damage to the flowers by late spring frosts.

Type of soil

Strawberry plants require loam, sandy loam, or a sandy soil with a pH of 5.5, to 6.5. The soil must be deep and rich in organic matter. Drainage, including good surface drainage, is very important.

The first condition for successful strawberry growing is to put the plants in land which is free from weeds, especially couch grass. A good way to decrease the weed population and prepare the soil for strawberry planting is by growing hoed crops in it for at least two seasons previously.

Strawberry plants must not be grown after eggplants, peppers, potatoes, tomatoes, or raspberries because these crops are susceptible to verticillium wilt and, even if they themselves show no symptoms of the disease, they infect the soil. In addition, a rotation of at least four years must be practised to maintain soil fertility, build up organic matter reserves and control insects, disease, and weeds.

As regards soil fertilization, it would be advisable to consult the leaflet entitled "Petit Fruits - Culture", Agdex 230/20 prepared by the Conseil des productions végétales du Québec.

Planting

Planting must be done early in the spring, generally at the end of April or the beginning of May. The young strawberry plants will then produce stolons (runners whose terminal bud puts down roots) in July. This is an advantage because stolons formed early in the season produce much more fruit than those which grow at the end of summer or in the fall.

To obtain high yields, it is preferable to set out only certified plants of varieties recommended by the Conseil des productions végétales du Québec. Such plants are produced by growers subsidized and directed by the ministère de l'Agriculture du Québec. They must be planted out as soon as they are received. In sunny or windy weather, they must be kept damp and handled with care. If the very fine roots are left uncovered, they will dry up after a few minutes exposure to sun or wind.

Planting is done in well worked soil, care being taken to place the crown (where the root and stem meet) level with the soil surface and to firm the soil around and above the roots. Strawberry plants are set out in rows. The rows are spaced 90 cm apart and a distance of 46 cm is left between plants in the row.

Care of the plantation

Yield and quality depend mainly on the growth and development of stolons during the first summer following plantation. It is therefore important to pay special attention to growing methods, such as the weeding, hoeing, hilling, weed control, and irrigation which are conducive to strong plants and early runnering.

When the first runners are 12 to 15 cm long, they are placed at a distance 12 to 15 cm from the parent plant in the direction of the row. As soon as the row of plants is about 46 cm wide, all the other runners which grow out beyond this distance on each side of the row are cut off. Remove the flowers which appear in the year of planting, as this hastens the formation of runners and increases their number. A strawberry plantation started in spring, weeded and hoed during the

summer, and protected by a mulch against winter cold, gives a good yield the following year.

Mulching

Mulch protects against winter-killing, delays growth in the spring, thus avoiding damage from late frosts. It reduces soil moisture evaporation, favours fruit cleanliness, protects against grey mould rot and stops growth. Oat, wheat, barley, and rye straw are ideal for mulching. A herbicide must be applied to the mulch so as to prevent germination of cereal and weed seeds.

Much must be applied in the fall when the soil is slightly frozen; it is removed the following spring when the new strawberry leaves start growing and when the foliage becomes light yellow. One third to one half of the mulch is left on the plants so that they can pierce through it and the rest is spread between the rows, taking care to cover all the soil surface, especially the edges of the rows.

Picking and keeping

Strawberries are very perishable. When they are ripe (end of June — beginning of July), they must be picked every two days. When ripening is rapid, daily picking may be necessary. Strawberries intended for consumption in the fresh state may be picked when they are entirely red.

Renewing a strawberry plantation

In a vegetable garden, a strawberry plantation may be kept up to three years, but after a second harvest, it is usually difficult to maintain it. There is an advantage in rejuvenating the strawberry plantation in August of the second year by planting the most vigorous and the most productive plants available. This rejuvenation makes it possible to maintain the strawberry patch in a good state of production. In the case of a field plantation, it is advisable to replant each spring and eliminate old plantings right after their first harvest. This advice also applies to those amateur gardeners who can put it into practice.



Celebrating Dewittville's 20th Anniversary, standing left to right, Peggy McCaig, Marion Ruddock, Arlene McIntosh, Irene McLean, Jean Martin, Anne Saumier. Seated, Carol Greenbank, Margie Moore, Alexa Bryson, and Greta Bulow.

20th Anniversary

A spring meeting helped **Dewittville** celebrate their 20th anniversary. There were 10 charter members present along with the usual group. A reporter from the Gleaner was on hand for photos.

The guest speaker for the evening was Ruth Graham, a local nurse, who helps with the teaching of nursing assistants at the local high school. She spoke about entrance requirements, the program, and some of the girls' experiences who have taken the course. She mentioned that the program is open to people from the community who would like to begin a career in nursing.

Esther Cavanagh, one of our members, made and decorated a beautiful anniversary cake, which was cut and served after the regular meeting. Many fond memories of activities of the once fledgling group kept all entertained during the social hour.

Mrs. Jas. Robertson represented Quebec at the last Associated Country Women of the World Conference which was held in Kenya. Early last year her two-part report appeared in the Macdonald Journal. She also kindly sent along an outline of the Resolutions and Recommendations from the ACWW Conference, which we could use when space permitted. (Space permits!)

Resolutions

The World's Diminishing Stocks of Raw Materials:

That ACWW ask the United Nations General Assembly to consider declaring an international year for the study of diminishing stocks of raw materials in the world today.

Nutrition Education Project: That the Nutrition Education/Save Sight project be continued.

International Uniformity in Labelling Pesticides: That ACWW urges the United Nations to promote uniformity in labelling pesticides and

other potentially harmful substances being sold overseas after being banned from home markets. ACWW feels that this is an urgent need.

Five other resolutions were passed in connection with rules governing the internal workings of ACWW.

Recommendations

There were 27 recommendations put forward of which 24 were accepted. Five concerned women — their status, education, opportunities, and value of their work as homemakers. These were combined and studied. It was recommended that the role of women's work in the home — child rearing, helpmate, domestic food production, preservation and home maintenance — be valued in proper perspective to other occupations. Women should have access to continuing education in all fields, particularly technical and vocational training in agricultural sections of the world.

Use of radioactive material: That ACWW urge world authorities to hasten the time when radioactive material is used only for medical and purely non-military purposes.

Breast cancer: That ACWW recommends to its sister organizations that they begin to promote the earliest diagnosis of breast cancer through the national health education program of the country and/or through voluntary organizations. Special attention should be paid to this in industrial countries where breast cancer has steadily increased.

Encourage attempts to increase the habit of breast feeding: That ACWW urges its affiliated societies to encourage the habit of breast feeding in their own countries and to

back up strongly the efforts by international agencies, such as UNICEF, to encourage the practice of breast feeding in developing countries.

Comprehensive health education services: That increased provision be made in specific areas of health education and services for the entire family, particularly in nutrition, parent education, family planning, dangers of alcohol and other drugs, hazards of smoking, and overall help for being the best that we can.

Children: That we endorse and pledge those provisions in education which instill a sense of pride and selfworth within the individual.

Aerosol products: That apprehension is expressed about the increasing use of aerosol containers and that the UN be approached to make it a world-wide action that the sales of same be limited until it can be established that they are not destroying the ozone layer. Research should be encouraged to find a safer propellant or efficient spray; in the interim period the danger of using aerosols should be brought before the public.

Survey of extension work done by Societies: That an ad hoc committee be set up to consider the possibilities of holding a survey of the varied aspects of extension work as it is being carried out by the affiliated Societies for the benefit of their members and countries. This could be put in booklet form. This survey to include the work carried out in cooperation with the various governments and the joint projects with the UN bodies.

Information about poisonous wild, cultivated, and house plants: That study programs be encouraged to inform members about poisonous plants; that members assist communities in education on poisonous plants; that Societies of ACWW support regulations for labelling and sale of poisonous seeds, bulbs, and plants, including a warning to notify

a physician in case of poison symptoms.

Energy: In view of the seriousness of pollution and the fact that there is insufficient knowledge of the side effects of nuclear energy, that we press for the increased development of solar energy and the investigation of the storage of energy.

Another recommendation concerning energy: conserve our present sources and further resolve to support research for alternate sources.

Exploration: That members of ACWW become informed on studies and exploration of land, sea, and air space, as well as seeking information about potential life and existence on other planets and on the sea bed.

Chain of friendship: In view of the racial problems existing in society, that ACWW start a chain of friendship by holding a friendship year in 1980, our jubilee year, in which each member would seek personal contact with a person of another race or cultural background, the links of the chain to be continued on a person to person basis.

Dear WI Members:

It is the month of May, and there are so many beautiful new things around us, bright flowers, green trees, and new-born lambs and foals. The birds, busy with their nests, have an especially merry lilt to their songs. This renewing of life is a stimulus to us, and we feel like starting over again, and sometimes very mundane things help us, new curtains, a new dress, or a new baseball mitt.

The March letters reported interesting programs for the coming year, and a number of branches welcomed new members. **Orms-town, Richmond Young Women, Dunham, and Wright** have two new members, **Arundel**, three, and **In-vernness, Grenville, Shipton**, one. All branches wrote that annual

reports had been given, dues paid, plans made for County Conventions and even for the annual Provincial meeting. Also, the majority of branches are preparing book marks for the FWIC Convention.

At the **Dewittville** meeting, members paid a fine if they had not worn something green to honour St. Patrick. This branch had word from a former member now working in Lesetho, Africa, and a donation was sent to the project there to honour the Year of the Child, also a donation toward music supplies at St. Joseph's School in Huntingdon. Plans were made to cater for the Arts and Crafts Centre. Members of this branch also made a dessert which was numbered, drawn for, and paid for as a contribution to Pennies for Friendship, then eaten as part of lunch with tea or coffee. **Hemmingford** members are studying ways of making meetings more interesting and to this end are submitting unsigned suggestions for the next meeting. The 67th annual meeting of **Howick** branch was preceded by a potluck luncheon enjoyed by 33 members. President Isabel Templeton gave an illustrated talk on a trip she and her husband had taken to San Antonio, Texas. Home Economics Convener Hazel Robertson was happy to report that a new television set had been obtained for the mentally retarded class in Huntingdon through the program of redeeming sales slips from Dominion stores.

Huntingdon made a gift of \$50 to the Little Green Library for the purchase of books for the youth of the town. Again this year the Laura Rose Stephen Scholarship of \$250 is available to a girl from Chateauguay Valley Regional High School who has received entrance in any branch of home economics at a qualified college. Another County branch, **Dundee**, plans to serve refreshments at the Arts and Crafts Centre in Huntingdon. Thirty-three members were present at the annual meeting of Ormstown WI which



Frontier members on their annual St. Valentine's visit to Manoir St. Philippe with 127 gaily wrapped boxes of home-made candy. In the upper photo Dorothy Keattie (with box in hand) is ready to greet a resident, while Jean Clark exchanges a few words with Mrs. Ellen Johanson. Lower photo, left to right, Mrs. Sydney Mott, Mr. Robert Bigelow, Mr. Robert Blakely, and Mrs. J. W. Heatlie enjoy a few minutes in cheerful conversation.

was held at the Walshaven Residence where a hot turkey lunch was served. The retiring President, Willa Hooker, has held the office for many years and has given of her time and many talents to ensure that this group "put into action their better impulses." To honour the Year of the Child, **Aubrey-Riverfield** made a donation to the special education class at the regional school.

Kinnear's Mills reports that \$78 was netted at the bake sale held in Thetford Mines, and **Inverness** members set a tentative date for a garage sale.

Stanstead North is sponsoring an art contest with cash prizes to three levels in Sunnyside Elementary School as a means of observing the Year of the Child. The same branch also donated \$20 toward a Guide Ranger's trip to California this spring. **Hatley Centre** placed a book "Flowers of the World" in the North Hatley Centre. **Beebe** sponsored a raffle of a Raggedy Anne doll as a benefit for the above-mentioned

Guide Ranger's trip. The same branch, in conjunction with the United Church Women's Group, held a card party and donated the money raised to the Butters Memorial Home. Mrs. Miriam Osborne, a **Stanstead North** WI member for 50 years, was presented with a pin at the March meeting.

Matagami reports that prizes were to be presented in April to the winners of the poster contest which the WI had sponsored to honour the Year of the Child. Pupils of elementary school age, both English and French, took part in this project.

The President of **Clarendon** read a letter from CanSave regarding knitting and donations of money. The article to be written on a pioneer woman was discussed. The President, Mrs. Knox, the in-coming President, Mrs. Robinson Hodgins, and Mrs. Walter Kilgour performed a very pleasant task. They presented Mrs. Tom Stephens with an Abbie Pritchard Throw. This took Fern completely by surprise. The sum of

\$400 was donated to the local hospital.

A member of **Granby West** WI donated a hand-knitted afghan which will be drawn for in September. The Convener of Agriculture for **Granby Hill** said that geraniums can be dug up in the fall, the dirt shaken off, and then hung up; in the late winter or early spring shoots will start and sometimes there may even be blossoms before it is time to plant them outside. A special note from this branch: "four members had perfect attendance this past year — Mrs. Blanche Coupland, 97 years old, a member of 55 years was one of the four. She was Shefford County's first President and after we repeated the Creed, she said, 'I wonder how many times I've said that?'" Another happy news item is that Mrs. Ossington continues to improve, is using a walker and the ladies expect to see her at a meeting before too long. Another branch in Shefford County, **Waterloo-Warden**, is proud

to announce that four members had perfect attendance last year.

For the election and installation of officers of **Fordyce** branch, Mrs. Cedric Dougall, a charter member, took the chair. It is the first time in the history of this branch that a mother has installed her daughter as President, namely, Mrs. Norma Sherrer. Congratulations were extended to Mrs. Elsa Syberg and her husband John, who were celebrating their golden wedding anniversary. After taking the chair, Mrs. Sherrer called on Mrs. Helen David to make a presentation of a Life Membership to Mrs. Reda Lewis, past President. **Cowansville** branch had a small food sale to reimburse funds.

Three branches in Richmond County: **Spooner Pond**, **Shipton**, and **Dennison Mills** presented small gifts to their out-going presidents. **Richmond Hill** had seven members with perfect attendance and **Cleveland** had two. **Dennison Mills** held a potluck dinner and entertained two visitors and **Richmond Hill** ladies have two quilts finished for sale and a third started. **Cleveland** sold books, money going to Pennies for Friendship. At the annual meeting members draw names to find out who their secret pal is for the coming year.

Nine branches reported from Argenteuil County where plans were made for the annual meeting to be held in **Grenville** in the new Community Hall. At **Arundel**, Mrs. Elizabeth Hutchinson, the wife of the Anglican minister, who belonged to the WI in England and Scotland before coming to Quebec this year, joined the organization. This branch has gained eight new members this past year, many of them are now holding office and have brought new ideas and new life into the branch. The annual meeting of **Brownsburg** was preceded by a luncheon — very delicious — catered by **Dalesville Louisa**. Both

Lakefield and **Upper Lachute East-End** groups are working on quilts. The annual meeting of **Jerusalem-Bethany** was held at the home of Mrs. Douglas Smith where a delicious potluck supper was enjoyed by the members prior to the meeting. Each member is to make \$2 talent money for the next meeting, and at **Pioneer's** annual, the members voted a donation to Telethon and an in memorium to Argenteuil Senior Citizens' Home.

We regret to say that our Publicity Convener for Sherbrooke County, Mrs. D. Tracy, met with an accident as she was leaving a county meeting early in the New Year. Mrs. Tracy said she would be forced to resign; this we regret very much. A few highlights from the county's winter meetings. **Brompton Road** are making plans to celebrate their 55th anniversary. The guest speaker at Milby was Mrs. Richard Brown who talked on the art of quilting and displayed many blocks as samples, showing her exquisite hand stitches. She pointed out that the art was introduced to America from Europe by French and British settlers — it was a real necessity in those days. Some of the patterns shown were: log cabin, grandmother's flower garden, fair winds, star bright, and whispering leaves. To quote Mrs. Tracy, "A charming woman of many accomplishments; we were fortunate to have the benefit of her experience." The Education Convener of the Lennoxville group spoke on the Block Parent Plan and urged members to assist in the safety of children in the area. Mrs. H. Wallace read an article on the defence of small towns in Canada. There is a sense of identity and certain comfort and security in knowing your neighbour and most of the people in town. The people have a concern for the safety of children when the parents are not around. Ten members of **Ascot** branch had perfect attendance last year. The Home Economics Convener of

Belvidere reported gratifying results from the handicraft sale at the Sher-Lenn Rock-a-thon.

A reducing exercise was given at **Wright** branch recently and other ways of keeping fit were discussed. A reading, "Add years to your life" told how doctors are trying to get patients to act in their own best interest when given health rules. Their February meeting was their 40th anniversary and husbands and friends joined members for supper and anniversary cake. Pen pal letters were read at the March meeting: one from Charlie Lake, B.C., the other from Port Dover, Ont.

Some roll calls reported are: **Inverness**, Name something found in stores 25 years ago but not today. Some answers were: cake Bon Ami, stove polish that will stay on the stove, barrels of flour and apples, bars of Comfort soap, and Royal yeast cakes. **Matagami**, give your first name and tell the origin of it. **Clarendon**, housekeeping hints, **Waterloo-Warden**, Bring an article of handicraft made during the winter (to show, not give). These varied from a beautiful quilt to mittens, sweaters, quilt blocks, dress hangers, place mats, and hooked wall hangings. **Howick**, a beautiful Irish song, and **Wright**, tell an Irish joke.

Mottoes submitted are: **Kinnear's Mills**, he is lonely who builds a wall instead of a bridge. **Waterloo-Warden**, accept office, it's better to do things than to criticize. **Granby Hill**, blessed is she who can give without remembering and can take without forgetting. Prior to signing the peace treaty with Egypt, Prime Minister Begin of Israel said, "Peace is the love of a mother, peace is the joy of a father, and peace is the togetherness of a family."

Gladys C. Nugent,
QWI Publicity.



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